

contact x was as ineffective as before (822); the introduction of chemical action at x was as striking in its influence as in the former case (819); all the results were, in fact, parallel to those already obtained; and if the reasoning then urged was good, it will now follow that the contact of platinum and nickel with each other, or of either with any of the different metals or solid conductors introduced at x_y is entirely without electromotive force.¹

825. Many other pairs of metals were compared together in the same manner; the solution of sulphuret of potassium connecting them together at one place, and their mutual contact doing that office at another. The following are cases of this

kind: iron and gold; iron and palladium; nickel and gold; nickel and palladium; platina and gold; platina and palladium.

In all these cases the results were the same as those already given with the combinations of platinum and iron.

826. It is necessary that due precaution be taken to have the arrangements in an unexceptionable state. It often happened that the first immersion of the plates gave deflections; it is, in fact, almost impossible to put two plates of the *same metal* into the solution without causing a deflection; but this generally goes off very quickly, and then the arrangement may be used for the investigation (814).

Sometimes there is a feeble but rather permanent deflection of the needle; thus when platinum and palladium were the metals, the first effect fell and left a current able to deflect the galvanometer-needle 3° , indicating the platinum to be positive to the palladium. This effect

of 3° , however, is almost nothing compared to what a mere thermo current can cause, the latter producing a deflection of 60° or more; besides which, even supposing it an essential effect of the arrangement, it is in the wrong direction for the contact theory.

I rather incline to refer it to that power which platinum and other substances have of effecting combination and decomposition without themselves entering into union; and I have occasionally found that when a platinum plate has been left for some hours in a strong solution of sulphuret of potassium (800) a small quantity of sulphur has been deposited upon it. Whatever the cause of the final feeble current may be, the effect is

¹ One specimen of nickel was, on its immersion, positive to platinum for seven or eight minutes, and then became neutral. On taking it out it seemed to have a yellowish tint on it, as if invested by a coat of sulphuret; and I suspected this piece had acted like lead (873) and bismuth (883). It is difficult to get pure and also perfectly compact "nickel; and if porous, then the matter retained in the pores produces currents.